P-DUKE POWER

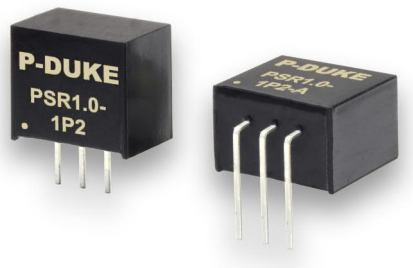
PSR1.0 Series

Non-Isolation DC-DC Converter

3 YEARS WARRANTY

ROHS COMPLIANT

REACH COMPLIANT



Automation | Datacom | IPC

Industry | Measurement | Telecom

Automobile | Boat | Charger

Medical | PV | Railway

NON -isolation | LOW Standby Power | NO Min. Load Required | OCP | OTP | SCP

PART NUMBER STRUCTURE

PSR1.0 - 5P0 - A

Series Name	Output Voltage (VDC)	Mounting Options
	1P2:1.2 **1P5:**1.5 **1P8:**1.8 **2P5:**2.5 **3P3:**3.3 **5P0:**5.0 **6P5:**6.5 **9P0:**9.0 **012:**12 **015:**15	**□:**Vertical Mounting **A:** Horizontal Mounting

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TECHNICAL SPECIFICATION All specifications are typical at nominal input, full load and 25℃ unless otherwise noted

Positive output application

Model Number	Input Range	Output Voltage	Output Current @Full Load	Input Current @ No Load	Efficiency		Maximum Capacitor Load
					Min. Vin	Max. Vin	
	VDC	VDC	A	mA	%	%	μF
PSR1.0-1P2	4.6 ~ 36	1.2	1	1.0	74	62	470
PSR1.0-1P5	4.6 ~ 36	1.5		1.0	78	65	
PSR1.0-1P8	4.6 ~ 36	1.8		1.0	82	69	
PSR1.0-2P5	4.6 ~ 36	2.5		1.0	87	75	
PSR1.0-3P3	4.75 ~ 36	3.3		2.0	91	78	
PSR1.0-5P0	6.5 ~ 36	5.0		1.0	94	84	
PSR1.0-6P5	9.0 ~ 36	6.5		1.0	93	87	
PSR1.0-9P0	12 ~ 36	9.0		1.0	95	90	
PSR1.0-012	15 ~ 36	12		1.0	95	92	
PSR1.0-015	18 ~ 36	15		1.0	96	94	

INPUT SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Operating input voltage range	With an external input capacitor C1 (22μF/50V) for input voltage > 32VDC. It allows the module operates from 32 to 36VDC.	PSR1.0-1P2	4.6	9	36	VDC
		PSR1.0-1P5	4.6	9	36	
		PSR1.0-1P8	4.6	9	36	
		PSR1.0-2P5	4.6	9	36	
		PSR1.0-3P3	4.75	9	36	
		PSR1.0-5P0	6.5	12	36	
		PSR1.0-6P5	9.0	12	36	
		PSR1.0-9P0	12	24	36	
		PSR1.0-012	15	24	36	
		PSR1.0-015	18	24	36	
Rise time	Time for Vout rises from 10% to 90% of Vout				2	ms
Input filter				Capacitor type		
Input reflected ripple current				150		mAp-p

OUTPUT SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Voltage accuracy			-2.0		+2.0	%
Line regulation	Low Line to High Line at Full Load		-0.2		+0.2	%
Load regulation	10% to 100% of Full Load					
	Vertical mounting	1.2Vout, 1.5Vout	-0.6		+0.6	%
		Others	-0.4		+0.4	
	Horizontal mounting	1.2Vout, 1.5Vout, 1.8Vout	-1.2		+1.2	
		Others	-0.4		+0.4	
Ripple and noise	Measured by 20MHz bandwidth	Vout≦6.5VDC		50		mVp-p
		Vout≧9.0VDC		75		
Temperature coefficient			-0.015		+0.015	%/℃
Dynamic load response	50% load step change	Peak deviation		150	200	mV
		Recovery time		250	350	μs
Output start-up overshoot					+1	%
Over load protection				2.5		A
Short circuit protection				Continuous, automatics recovery		

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GENERAL SPECIFICATIONS

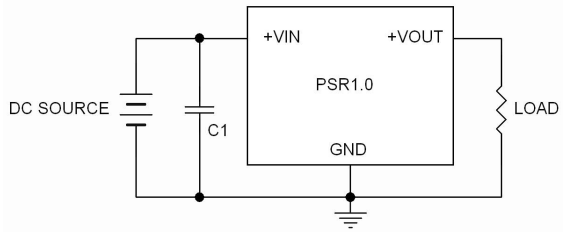
Parameter	Conditions	Min.	Typ.	Max.	Unit
Switching frequency		400	500	600	kHz
Safety meets				IEC/ EN/ UL62368-1	
Case material				Non-conducted black plastic	
Potting material				Silicone (UL94 V-0)	
Weight				1.9g (0.067oz)	
MTBF	MIL-HDBK-217F, Full load			2.571 x 10^7 hrs	

ENVIRONMENTAL SPECIFICATIONS

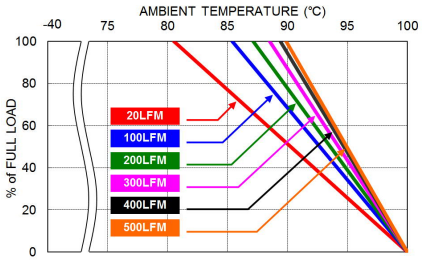
Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating ambient temperature	With derating	-40		+100	℃
Over temperature protection	Internal IC junction		150		℃
Storage temperature range		-55		+125	℃
Thermal shock				MIL-STD-810F	
Vibration				MIL-STD-810F	
Relative humidity				5% to 95% RH	

CAUTION: This power module is not internally fused. An input line fuse must always be used.

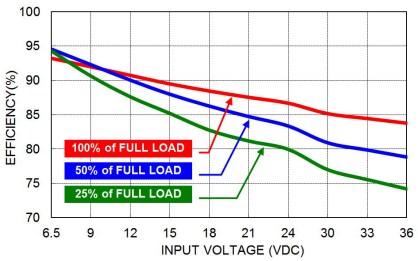
APPLICATION CIRCUIT



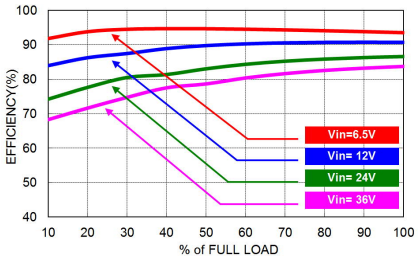
CHARACTERISTIC CURVE



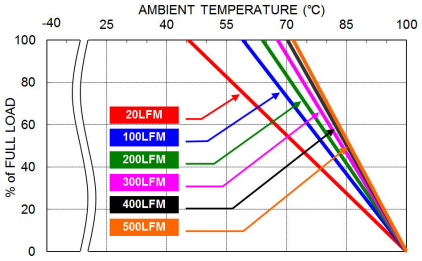
PSR1.0-5P0 Derating Curve
LOW VIN



PSR1.0-5P0 Efficiency vs. Input Voltage



PSR1.0-5P0 Efficiency vs. Output Load



PSR1.0-5P0 Derating Curve
High VIN

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FUSE CONSIDERATION

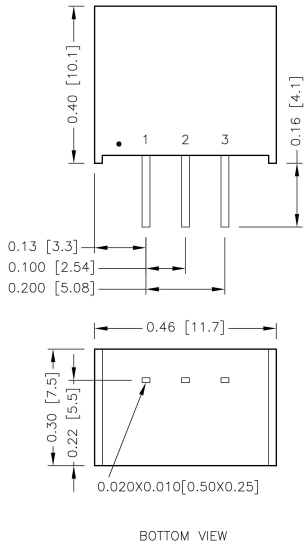
This power module is not internally fused. An input line fuse must always be used.
This encapsulated power module can be used in a wide variety of applications, ranging from simple stand-alone operation to an integrated part of sophisticated power architecture.
To maximum flexibility, internal fusing is not included; however, to achieve maximum safety and system protection, always use an input line fuse.
The input line fuse suggest as below :

Model	Fuse Rating (A)	Fuse Type
PSR1.0-1P2	0.63	Slow-Blow
PSR1.0-1P5、PSR1.0-1P8	0.8	Slow-Blow
PSR1.0-2P5、PSR1.0-3P3、PSR1.0-6P5、PSR1.0-9P0	1.25	Slow-Blow
PSR1.0-5P0、PSR1.0-012、PSR1.0-015	1.6	Slow-Blow

The table based on the information provided in this data sheet on inrush energy and maximum DC input current at low Vin.

MECHANICAL DRAWING

Standard type: Vertical mounting



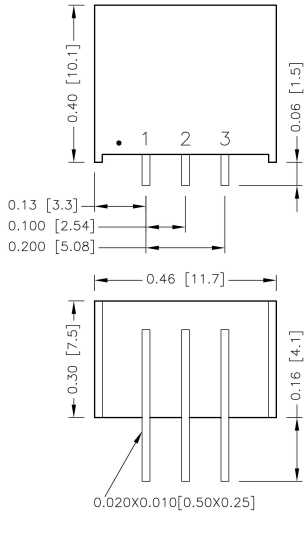
BOTTOM VIEW

PIN CONNECTION

PIN	DEFINE
1	+Vin
2	GND
3	+Vout

1. All dimensions in inch [mm]
2. Tolerance :x.xx±0.02 [x.x±0.5]
   x.xxx±0.01 [x.xx±0.25]
3. Pin dimension tolerance ±0.004[0.10]

Suffix-A: Horizontal mounting

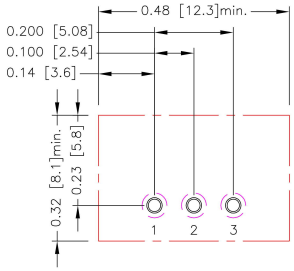


BOTTOM VIEW

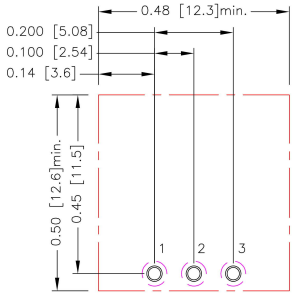
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RECOMMENDED PAD LAYOUT

Standard type: Vertical mounting



Suffix-A: Horizontal mounting



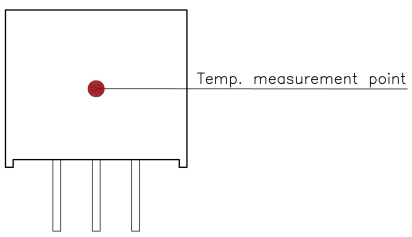
All dimensions in inch[mm]
Pad size(lead free recommended)
Through hole 1.2.3: ∅0.031[0.80]
Top view pad 1.2.3: ∅0.039[1.00]
Bottom view pad 1.2.3: ∅0.063[1.60]

THERMAL CONSIDERATIONS

The power module operates in a variety of thermal environments.
However, sufficient cooling should be provided to help ensure reliable operation of the unit.
Heat is removed by conduction, convection, and radiation to the surrounding Environment.
Proper cooling can be verified by measuring the point as the figure below.
The temperature at this location should not exceed 100℃.
When Operating, adequate cooling must be provided to maintain the test point temperature at or below 100℃.
Although the maximum point Temperature of the power modules is 100℃, you can limit this Temperature to a lower value for extremely high reliability.

The unit will shutdown if the internal IC junction exceeds 150℃ (typical), but the thermal shutdown is not intended as a guarantee that the unit will survive temperature beyond its rating. The module will automatically restart after it cools down.

■ Thermal test condition with vertical direction by natural convection (20LFM).



BACK VIEW

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